

### REMARKS

Applicants acknowledge receipt of the Office Action dated September 8, 2006.

#### Status of the Claims:

Claims 78-111 have previously been withdrawn due to non-elected (distinct) invention(s).

Claims 14, 37, 51, 66, and 112 are currently amended.

Claim 17 is herein withdrawn.

Claims 1-16, 18-77 and 112-119 are pending.

#### Rejections under 35 U.S.C. §102 (a)

In the Office Action, claims 1-4, 10-20, 22-30, 32-33, 35, 37-44, 46, 49, 51-69, 72-77, 112-115, and 117-119 are rejected under 35 U.S.C. §102(a) as being anticipated by Cheung et al., hereinafter "*Cheung*", (U.S. Pat. 6,465,391 B1). The Examiner states that there is no patentable distinction between the claimed catalyst and that disclosed by the reference, and thus the claims are anticipated by the teaching of *Cheung*.

Claims 1, 14, 37, 51, 66, and 112 are independent claims from which the rest of the pending claims depend. According to MPEP 2131, "a claim is anticipated only if each and every element as set forth in the claim is found, either implicitly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.1987).

#### I. Claim 1

Claim 1 states "a selective hydrogenation catalyst *consisting essentially of*: a precursor comprising at least one Group VIII metal disposed on an inorganic support; a second metal selected from the group consisting of Group IB metals, Group IIB metals, Group IIIA metals, Group VIIB metals, and combinations thereof, disposed on the precursor." *Cheung* claims "a catalyst composition comprising an inorganic support material, a palladium component, a silver component, and a promoter component, wherein said promoter component has a formula  $XYF_n$ , wherein X is an alkaline metal, Y is an element selected from the group consisting of antimony and phosphorus, and n is an integer which makes  $XYF_n$  a monovalent anion." The catalyst of *Cheung* necessarily contains fluorine and silver. *Cheung* also states (Column 3, lines 10-13) that "suitable promoter components include  $KPF_6$ ,  $KSbF_6$ ,  $KAsF_6$ ,  $KBF_4$ ,  $KAlF_4$ ,  $KPF_6$  and  $KSbF_6$ , with  $KSbF_6$  being the most preferred

promoter component.” The catalyst of claim 1 of the present disclosure *consists essentially of* a support and first and second metals, and does not contain any fluorine. According to MPEP 2111.03, the transitional phrase “consisting essentially of” limits the scope of a claim to the specified materials or steps ‘and those that do not materially affect the basic and novel characteristics’ of the claimed invention.” *In re Hertz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original). The fluorine of the *Cheung* reference is an essential part of the promoter component of the claimed catalyst. Applicants thus respectfully traverse the Examiner’s statement on page 3, paragraph 2 of the Office Action wherein the Examiner states that there is no patentable distinction between the claimed catalyst and that disclosed by *Cheung*. Also, the catalyst of *Cheung* always contains a silver component in addition to the support, the palladium and the promoter component. The catalyst of claim 1 of the present invention may contain silver (a Group IB metal), but the silver is not a required component, as it is in the catalyst of *Cheung*.

In addition to the above remarks pointing out the distinction between the *Cheung* catalyst and that of the current instance, claim 1 of the current disclosure states “wherein the catalyst is capable of selectively hydrogenating acetylene with a conversion  $S_c$  of at least about 95% and a selectivity to ethylene relative to ethane  $S_s$  of at least about 25 when the catalyst is employed in a steady-state liquid phase hydrogenation process.” The Examiner refers (page 3, paragraph 1 of the Office Action) to Table C at col. 7 and col. 8 of *Cheung*, stating that this shows that Catalyst C has an acetylene conversion of 95.3% (run #3) with a selectivity to ethylene of 24.99%. Two things must be pointed out with respect to this information. Firstly, the feed of *Cheung* contains a large percentage (97.67% in Table C) of ethylene and a relatively small percentage of acetylene (1.13% in Table C). The feed used to test the catalysts of the present disclosure contained acetylene (4.2%) in NMP (N-methyl-2-pyrrolidone) and no ethylene. Secondly, the selectivity referred to in claim 1 of the current instance is defined as the ratio of the concentrations of the ethylene and ethane in the final product ([0076] of the present disclosure, for example). The selectivities cited in Table C of *Cheung* are calculated from the amount of ethylene that is formed from the amount of acetylene that is converted. Therefore,  $S_s$  for the run referred to by the Examiner would be 0.46  $((97.94-97.67)/0.59)$ , not 25. Due to this and differences in the feed the selectivities as reported are not directly comparable. Thus, the distinct catalyst of *Cheung* does not disclose a catalyst having, as in claim 1 of the present disclosure, “a selectivity to ethylene relative to ethane  $S_s$  of at least about 25 when the catalyst is employed in a steady-state liquid phase hydrogenation process.” Because each and every

element as set forth in the claim is not found, either implicitly or inherently described, in a single prior art reference, *Cheung* does not anticipate the catalyst of claim 1.

In view of the above remarks, it is respectfully submitted that *Cheung* does not anticipate claim 1, and it is requested that the rejection to claim 1 under 35 U.S.C. §102(a) be removed and claim 1 and claims 2-13 that depend there from be allowed.

## **II. Claims 14 and 112**

Amended claim 14 states “a composition *consisting essentially of*: a support; a Group VIII metal disposed on the support; a second metal selected from the group consisting of Group IIIA metals, Group IIB metals, Group VIIB metals, and combinations thereof, disposed on the support.” Amended claim 66 states “a supported catalyst for selective hydrogenation *consisting essentially of* a first metal selected from the group consisting of Group VIII metals and combinations thereof; a second metal selected from the group consisting of Group IIIA metals, Group IIB metals, Group VIIB metals, and combinations thereof.” As discussed in Section I above, the catalyst of *Cheung* necessarily contains fluorine and silver. The composition of claim 14 and the catalyst of claim 112 of the present disclosure *consist essentially of* a support and first and second metals, and do not contain any fluorine or any silver (a Group IB metal). The catalyst of *Cheung* always contains a silver component in addition to the support, the palladium and the promoter component. The fluorine of the *Cheung* reference is an essential part of the promoter component and the silver of *Cheung* is an essential component of the claimed catalyst composition. Applicants thus respectfully traverse the Examiner’s statement on page 3, paragraph 2 of the Office Action wherein the Examiner states that there is no patentable distinction between the claimed catalyst and that disclosed by *Cheung*.

In addition to the above remarks pointing out the distinction between the *Cheung* catalyst and the composition of claim 14 and the catalyst of claim 112, claims 14 and 112 of the current disclosure state “sustained activity for selective hydrogenation of at least 150 hours.” In the specification of the current invention ([0041], for example), it is pointed out that the teachings of the conventional art relating to the use of a polar solvent predict a progressive decline in catalyst activity with time on stream. Nowhere in *Cheung* is “a sustained activity for selective hydrogenation of at least about 150 hours” mentioned.

Because each and every element as set forth in the claim is not found, either implicitly or inherently described, in a single prior art reference, *Cheung* does not anticipate the composition of claim 14 or the catalyst of claim 112. In view of the above remarks, it is respectfully requested that

the rejections to claims 14 and 112 under 35 U.S.C. §102(a) be removed and claims 14 and 112 along with claims 15-36 and 113-119 that respectively depend there from be allowed.

### **III. Claims 37 and 66**

Amended claim 37 states “a catalyst active for liquid-phase selective hydrogenation *consisting essentially of*: Pd supported on particulate alumina; a subsequently supported second metal selected from the group consisting of Ga, In, Mn, Zn, and combinations thereof.” Amended claim 66 states “a supported catalyst for selective hydrogenation *consisting essentially of*: a first metal selected from the group consisting of Group VIII metals and combinations thereof; a second metal selected from the group consisting of Group IIIA metals, Group IIB metals, Group VIIB metals, and combinations thereof.”

As discussed in Sections I and II above, the catalyst of *Cheung* necessarily contains fluorine and silver. The catalysts of claim 37 and claim 66 of the present disclosure *consist essentially of* a support and first and second metals, and do not contain any fluorine or silver. The fluorine of the *Cheung* reference is an essential part of the promoter component, and the *Cheung* catalyst essentially contains silver in addition to the support, the palladium, and the promoter component. Again, Applicants respectfully traverse the Examiner’s statement on page 3, paragraph 2 of the Office Action wherein the Examiner states that there is no patentable distinction between the claimed catalyst and that disclosed by *Cheung*.

In addition to the above remarks pointing out the distinction between the *Cheung* catalyst and that of the current instance, claim 37 of the current disclosure states “a once-through acetylene conversion  $S_c$  of at least about 95%; and a selectivity for ethylene relative to ethane  $S_s$  of at least about 40,” and claim 66 states “and an ethylene selectivity relative to ethane  $S_s$  of at least 20 in liquid-phase hydrogenation of acetylene.” As discussed in Section I, *Cheung* does not disclose a catalyst having “a once-through acetylene conversion  $S_c$  of at least 95% and a selectivity for ethylene relative to ethane  $S_s$  of at least about 40” or “an ethylene selectivity relative to ethane  $S_s$  of at least 20 in liquid-phase hydrogenation of acetylene.” Because each and every element as set forth in the claims is not found, either implicitly or inherently described, in a single prior art reference, *Cheung* does not anticipate the catalysts of claims 37 and 66.

In view of the above remarks, it is respectfully submitted that *Cheung* does not anticipate claims 37 and 66. It is respectfully requested that the rejections to claims 37 and 66 under 35 U.S.C. §102(a) be removed and that claims 37 and 66 be allowed as well as claims 38-50 and 67-77 that respectively depend there from.

#### **IV. Claim 51**

Amended claim 51 states “a supported catalyst for selective hydrogenation *consisting essentially of*: a Group VIII metal; a second metal selected from the group consisting of Group IB metals, Group IIB metals, Group IIIA metals, Group VIIB metals, and combinations thereof.” As discussed in Sections I-III, the catalyst of *Cheung* necessarily contains fluorine. The fluorine of the *Cheung* reference is an essential part of the promoter component of the claimed catalyst composition. Applicants thus respectfully traverse the Examiner’s statement on page 3, paragraph 2 of the Office Action wherein the Examiner states that there is no patentable distinction between the claimed catalyst and that disclosed by *Cheung*. Also, the catalyst of *Cheung* always contains a silver component in addition to the support, the palladium and the promoter component. The catalyst of claim 51 of the present invention may contain silver (a Group IB metal), but the silver is not a required component, as it is in the catalyst of *Cheung*.

Because each and every element as set forth in the claim is not found, either implicitly or inherently described, in a single prior art reference, *Cheung* does not anticipate the catalyst of claim 51.

In view of the above remarks, it is respectfully submitted that *Cheung* does not anticipate claim 51, and it is requested that the rejection to claim 51 under 35 U.S.C. §102(a) be removed and claim 51 claims 52-65 that depend there from be allowed.

#### **Rejections under 35 U.S.C. §103 (a)**

In the Office Action, claims 5-6, 8-9, 21, 31, 34, 36, 45, 47-48, 50, 70-71, and 116 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Cheung* as applied to claims 1-4, 10-20, 22-30, 32-33, 35, 37-44, 46, 51-69, 72-77, 112-115, and 117-119 above, and further in view of Brown et al., hereinafter “*Brown*”, (PG-Pub. No. US 2001/0001805 A1).

As they depend from independent claim 1, dependent claims 5-6 and 8-9 are submitted to be patentable over *Cheung* for all of the same reasons put forth in Section I above. Similarly, claims 21, 31, 34 and 36, that depend from independent claim 14 and claim 116 that depends from

independent claim 112 are submitted to be patentable over *Cheung* for all of the same reasons set forth in Section II above. Claims 45, 47-48, and 50 that depend from independent claim 37 and claims 70-71 that depend from independent claim 66 are submitted to be patentable over *Cheung* for all of the reasons set forth in Section III above. As discussed in Sections I-IV above, *Cheung* fails as a primary reference. As discussed further hereinbelow, *Brown* fails to make up for the lack in the teachings of *Cheung*.

The Examiner states that *Cheung* discloses a catalyst as described above, except for the claimed Group IIB metals (or zinc) and Group VIIB metals (or Mn). The Examiner further states that "it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to have incorporated by adding these metal components into the catalyst of *Cheung* in order to achieve an improved catalyst having improved in the performance and activities because they are known as useful catalyst materials as evidenced by *Brown*" (Examiner refers to *Brown* at page 9, claims 7 and 19). Applicants respectfully traverse and, as discussed in Sections I-IV above, submit that *Cheung* fails as a primary reference. As discussed further hereinbelow, *Brown* fails to make up for the lack in the teachings of *Cheung*.

Applicants respectfully traverse the Examiner's rejections of claims 5-6, 8-9, 21, 31, 34, 36, 45, 47-48, 50, 70-71, and 116 under §103(a) as being unpatentable over *Cheung* in view of *Brown*. In order to establish a *prima facie* case of obviousness, the Examiner must meet the following three elements: 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings; 2) there must be a reasonable expectation of success; and 3) the prior art reference(s) must teach or suggest all the claim limitations. MPEP §2143 (2005) (citing *In re Vaack*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991)). If just one of these elements is not met, the Examiner has failed to establish a case of obviousness.

#### **A. All Claim Limitations Are Not Taught By The Combined References**

The MPEP §2143.03 provides that in order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claims against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The Group IIB metals (or zinc) and Group VIIB metals (or Mn) disclosed by *Brown* are indicated to be the metal of which the spinel consists. The spinel is the inorganic support for the composition. In the claims of the present instance, the Group IIB metals (or zinc) and Group VII metals (or Mn) are disposed *on* the support, and are not the metal of which the support is made. Thus, *Brown* does not teach all of the claim limitations, as *Brown* does not teach “Group IIB, ...VIIB metals...disposed on the support” as in the invention of the present disclosure, and one element for a *prima facie* case of obviousness is thus lacking.

**B. Lack of Motivation to Combine and No Reasonable Expectation of Success**

The MPEP §2143.01 provides that the prior art must suggest the desirability of the claimed invention, and that

[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. “The test for an implicit showing is that what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.” In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Lee, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). [underlining added]

Nowhere in *Brown* or *Cheung* is it suggested that it would be desirable to use Group IIB (or zinc) or Group VIIB (or manganese) as a promoter disposed *on* the catalyst. Also, combining the *Brown* reference with the teachings of *Cheung* would not yield the catalysts disclosed by claims 5-6, 8-9, 21, 31, 34, 45, 47-48, 50, 70-71, and 116, but rather a catalyst having zinc or manganese being the material from which the spinel support was made, and not a promoter disposed on an inorganic support. Thus, the combination of the teachings of *Cheung* with those of *Brown* would not give one a reasonable expectation of success in creating the catalysts or compositions of the present disclosure, and another element in the *prima facie* case of obviousness is thus missing.

Applicants respectfully submit that *Cheung* fails as a primary reference and *Brown* does not make up for the lack of teaching by *Cheung*. Accordingly, no *prima facie* case of obviousness can be established. Applicants respectfully request withdrawal of the 103§(a) rejections and allowance of claims 5-6, 8-9, 21, 31, 34, 36, 45, 47-48, 50, 70-71, and 116.

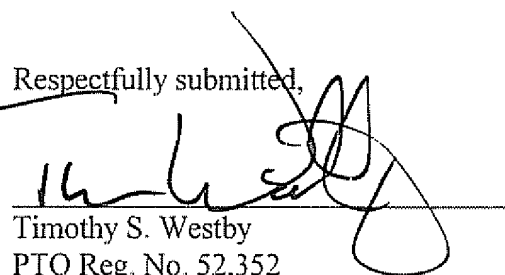
**Conclusion**

Applicants respectfully request reconsideration, allowance of the pending claims and a timely Notice of Allowance be issued in this case. If the Examiner feels that a telephone conference would expedite the resolution of this case, the Examiner is respectfully requested to contact the undersigned.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art that have yet to be raised, but which may be raised in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769.

Respectfully submitted,



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